

New Therapeutics in Cancer Treatment: Analysis of Socioeconomic and Demographic Characteristics of Use Among Acute Lymphoblastic Leukemia (ALL) Patients in the United States

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Background

Acute lymphoblastic leukemia may occur in children or adults and has a peak incidence between the ages of one and four years. The majority of cases of acute lymphoblastic leukemia occur in healthy people, and only a few patients have been found with predisposing factors such as inherited genetic predisposition or environmental exposure. It is characterised by chromosomal abnormalities and genetic changes that impair lymphoid precursor cell development and proliferation¹. Together with treatment response, these anomalies are significant prognostic variables. The introduction of disease-risk stratification and enhanced treatment regimens significantly improves the prognosis of patients with acute lymphoblastic leukemia, especially in children (1–14 years), but also in adolescents and young adults (15–39 years). However, elderly individuals (40 years) and patients with relapsed or refractory acute lymphoblastic leukemia continue to have a dismal prognosis². New immunotherapeutic methods, such as monoclonal antibodies and chimeric antigen receptor (CAR) T cells, are being researched and, in the next years, may significantly alter the therapy choices for acute lymphoblastic Leukemia³.

Objective

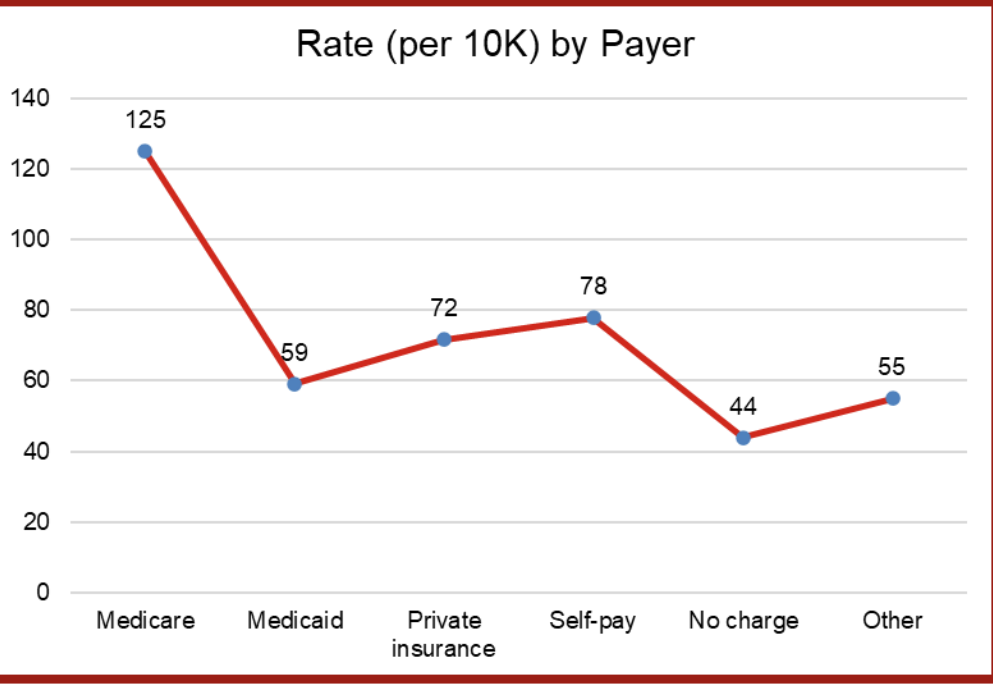
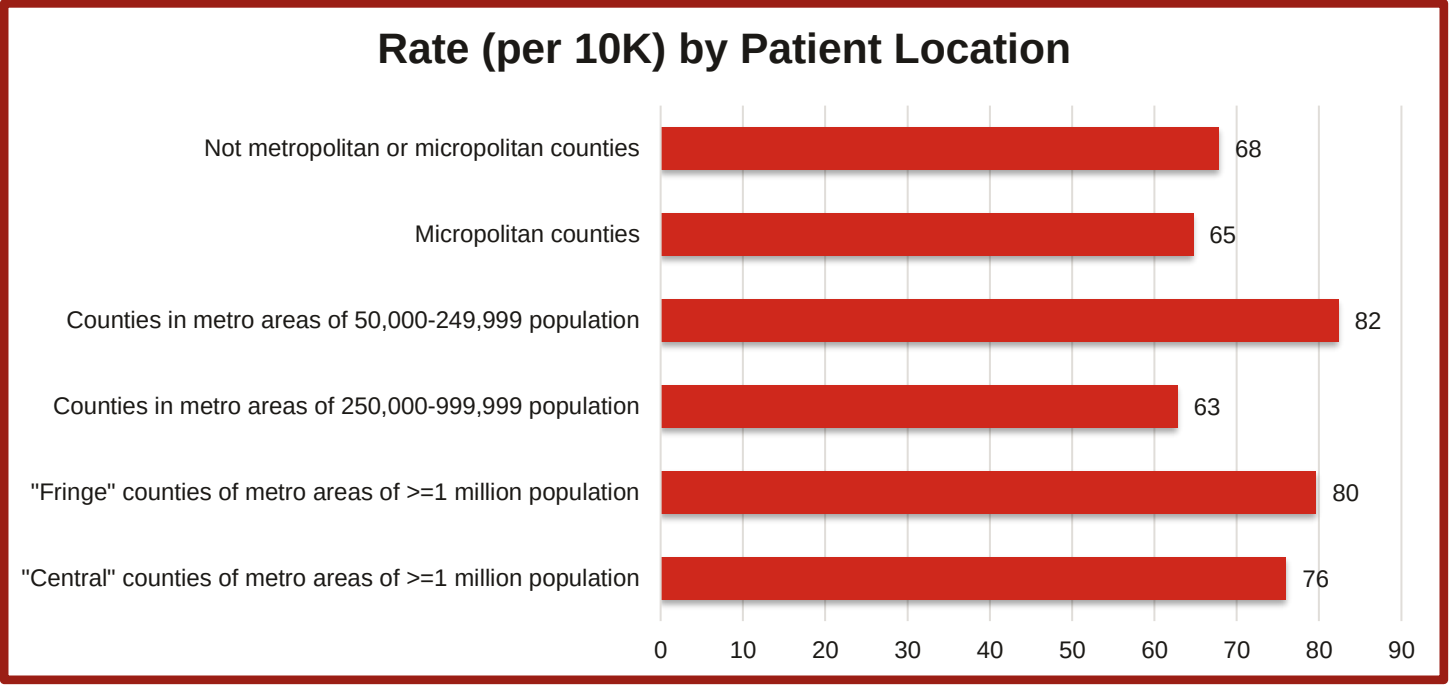
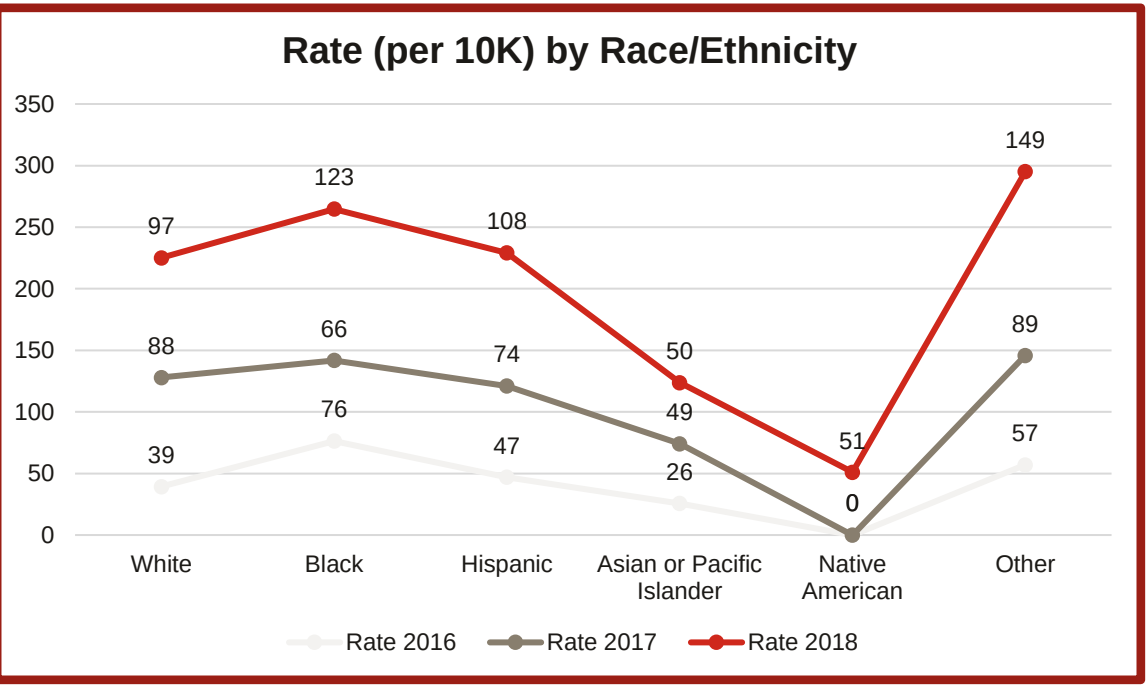
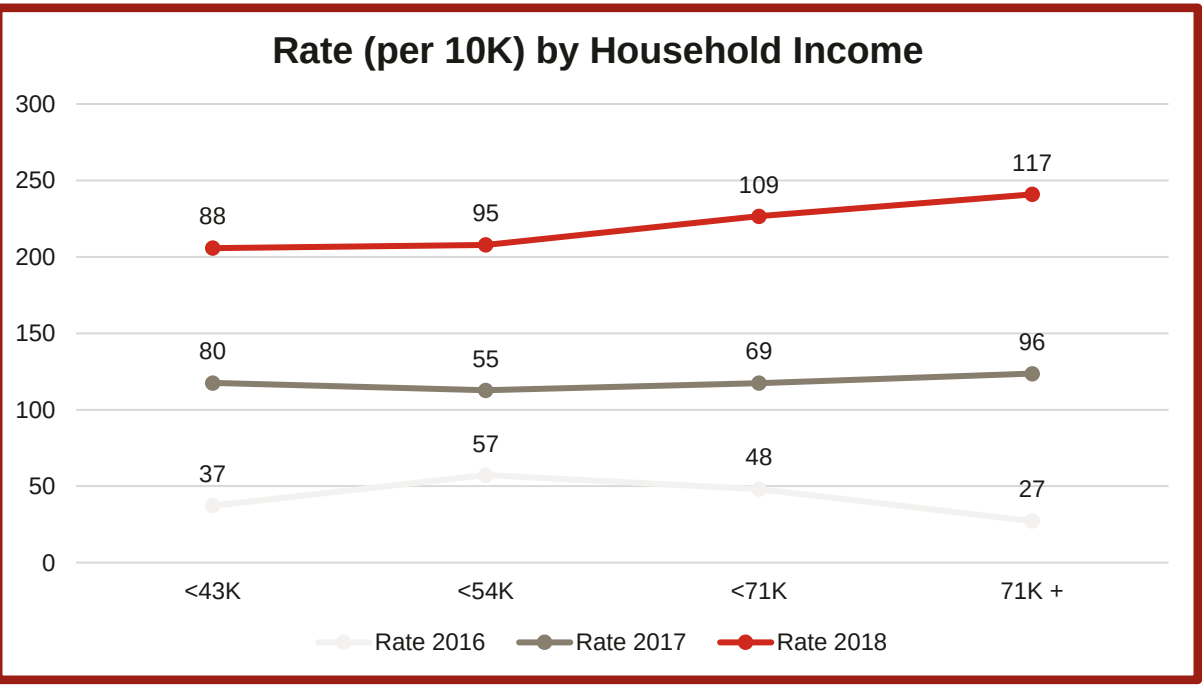
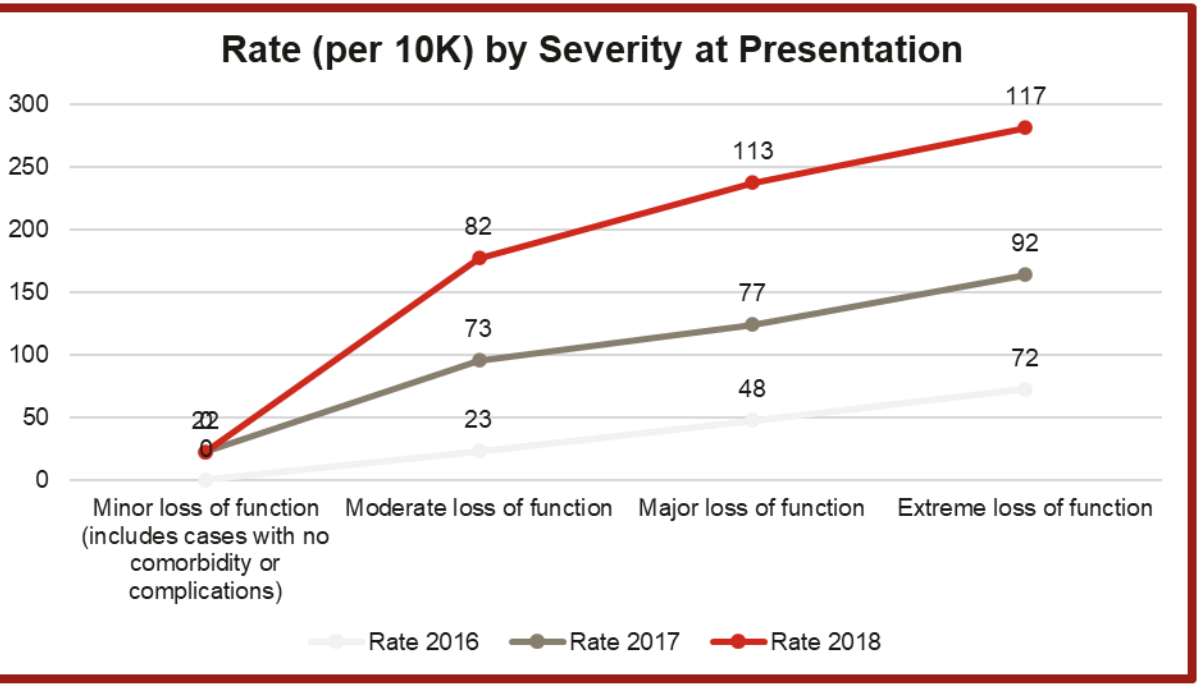
Evaluate the socioeconomic dynamics associated with new therapeutics use among acute lymphocytic leukemia (ALL) patients in the United States.

Study Design

This retrospective study included the primary and secondary diagnosis of acute lymphocytic leukemia (ALL) in the National Inpatient Sample (NIS) from the Healthcare Cost and Utilization Project (HCUP) between 2016 and 2018. ALL and new treatment therapeutics, diagnoses, and procedure codes were identified using their corresponding International Classification of Disease (ICD-10) codes. ALL ICD-10 codes were acute lymphoblastic leukemia not having achieved remission (C91.00), acute lymphoblastic leukemia in remission (C91.01), acute lymphoblastic leukemia in relapse (C91.02), and new technologies codes for anatomical regions (XW0, XW1, XW2). Patient characteristics and demographics data were analyzed among the population with both indicators. Chi-squared analysis was also conducted to identify relationships between variables.

Results

A weighted sample of 158,090 primary and secondary ALL diagnoses were identified. A total of 2,320 (1%) records with ALL diagnoses were treated with new therapeutics. The most common new therapies included administration of blinatumomab antineoplastic immunotherapy (1.9%), cytarabine and daunorubicin liposome (0.3%), and engineered autologous chimeric antigen receptor T-cell immunotherapy (0.2%). The utilization rate of engineered chimeric antigen varied by sex, with 6,250 males and 3,750 females per 10,000 hospitalizations. Use of new therapeutics varied significantly ($p < 0.001$) by region, with utilization rates reported for Middle Atlantic (130), Pacific (122), East North Central (122), and lowest in Mountain (69) regions. Significant variation ($p < 0.001$) exists in access and utilization of new therapeutics in large urban populated centers (122) compared to smaller rural areas (47). Significant variation ($p < 0.001$) exists in the use of new therapeutics by race and ethnicity, with the highest rate of use among Other (150) and White (116), and lowest rate among Black (80) and Asian/Pacific Islander (84). Individuals with a household income of \$54,000+ (113–119) were more likely to receive new therapeutics compared to the lowest household income of <\$43,000 (73) per 10,000 ALL hospitalizations.



Conclusion

Access to new therapeutics varied by race, income, and region. Therefore, providers and researchers must ensure comprehensive inclusion of all patient populations to better understand new drug effectiveness among these populations.

References

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3. Samra B, Jabbour E, Ravandi F, Kantarjian H, Short NJ. Evolving therapy of adult acute lymphoblastic leukemia: state-of-the-art treatment and future directions. J Hematol Oncol. 2020;13(1):70.